Aalto University
School of Business

SIN STOCK RETURNS DURING FINANCIAL CRISIS AND IN THE LONG TERM

Bachelor's Thesis
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Finance

Spring 2020

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Title of thesis Sin stock returns during financial crisis and in the long term

Degree Bachelor

Degree programme Finance

Thesis advisor(s) Juha Joenväärä

Year of approval 2020 **Number of pages** 20 + 5 **Language** English

Abstract

In this thesis, I have studied sin stocks' ability to generate abnormal returns both during financial crisis and in the long term. The universe of sin stocks studied in this thesis consists of firms involved in alcohol, gambling or tobacco industries. I found evidence that sin stocks have been able to outperform the stock market in the long term. Sin stocks' capability of generating abnormal returns after being discovered is against the efficient market hypothesis. Sin stocks' ability of generating abnormal returns after being discovered has been explained by social norms causing some investors to shun away from sin stocks and that there is not enough arbitrage capital to cover the deficit in demand. I did not find evidence that sin stocks would have outperformed stocks from comparable industries. Therefore, it seems likely that some other factors are causing the continuance of sin stocks' abnormal returns. The equal weighted sin stock portfolio underperformed and generated substantial negative excess returns during the financial crisis. However, other sin stock portfolios did not underperform. This indicates that the main reason for negative excess returns was gambling stocks' bad performance instead of all sin industries performing badly.

Keywords sin, financial crisis, abnormal return, excess return

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1 Introduction

The focus of this thesis is on sin stock returns. Sin stocks refer to shares of such companies those are involved in producing human vice. Sin stocks are in close relationship with socially responsible investing (SRI). Sin industries are often categorized as irresponsible and thus some investors shun away from them. In this work, the universe of sin stocks consists of companies operating in alcohol, tobacco or gambling industries.

Hong & Kacperzcyk (2009) found evidence that a portfolio long of sin stocks and short of comparables (food, soda, fun, hotels and entertainment) yielded excess return of approximately 25-30 basis points per month in time period from 1965 to 2006. According to efficient-market hypothesis, it should not be possible to form an investment strategy that constantly outperforms the market. Outperforming investment strategies have been found retrospectively with statistical analysis, but such strategies tend to lose their edge after information of such strategy has become public. Therefore, I was interested in studying whether sin stocks have been able to sustain their performance.

I found evidence that sin stocks have been able to outperform the market after the financial crisis. During the crisis, most sin stocks underperformed strongly. However, it is highly likely that most of the bad performance was caused by firms involved in gambling industry. Unlike Hong & Kacperzcyk (2009), I did not find any evidence that sin stocks would have outperformed a portfolio of stocks with comparable characteristics. Therefore, I find it plausible that sin stocks' ability of generating abnormal returns cannot be explained by social norms effects.

2 Motivation and research questions

The first goal of this work is to study whether sin stocks generated abnormal returns during financial crisis which started from the default of Lehman Brothers in September 2008. Sapienza & Zingales (2012) propose lack of trust in financial sector and the economic system in general as a possible reason for the economic decline. As sin industries are often considered as irresponsible, one could assume that they do not enjoy similar trust

from investors as industries considered responsible do. Therefore, it is possible that the crisis hit sin industries harder than other industries. My first research question is

Q1: Were sin stocks able to outperform during the financial crisis?

Lins et al. (2017) found evidence that firms with high corporate social responsibility (CSR) ratings outperformed firms with low CSR ratings during the financial crisis. This result indicates that sin stocks may not have performed well during the crisis. According to Hong & Kacperczyk (2009), on average 21% of sin companies' stocks were held by institutions, 24% less than the mean of their sample, in the period of 1980 to 2006. Considering that sin stocks appear to enjoy weaker institutional support, expressing a less committed ownership basis, and since high CSR firms reportedly outperformed low CSR firms during crisis (Lins et al. 2017), my hypothesis is that sin stocks underperformed during the crisis. Null hypothesis is that sin stocks performed in line with the general market.

My second research question is

Q2: Have the excess returns of sin stocks restored to similar level they were before the crisis?

According to the efficient market hypothesis, sin stocks should have lost the capability of generating positive abnormal returns since the information of the excess returns should be well known by the market participants by now. Therefore, the null hypothesis is that sin stocks have performed in line with the general market after the crisis.

Hong & Kacperczyk (2009) hypothesize that sin stocks' excess returns are a result of being neglected due to social norms in the stock market and that there is not enough arbitrage capital to eliminate the norm induced price effects. The popularity of the responsible investing has been increasing since their research. According to Global Sustainable Investment Alliance (GSIA, 2018), the total amount of sustainable investment assets in the five major markets[1] was $30.7 trillion at the start of 2018, an increase of 34% in two years. The sustainable investment market has grown and evolved globally since GSIA's inaugural study in 2012 (GSIA, 2018).

I anticipate that both the reveal of sin stocks' excess returns and the increasing popularity of responsible investing decrease the amount of arbitrage capital on the market and will affect the post-crisis returns of sin stocks. My hypothesis is that sin stocks have continued

[1] Europe, United States, Japan, Canada, Australia/New Zealand

to generate positive abnormal returns after the financial crisis but with smaller excess margin than before the crisis.

3 Data and methods

I performed a set of time series regressions to study whether sin stocks have generated abnormal returns over time. I used monthly returns and the time frame of interest was from January 1965 to December 2018. Four different time periods were studied:

- Pre-crisis period: January 1965 – July 2008,
- Financial crisis: August 2008 - March 2009,
- Post-crisis period: April 2009 - December 2018
- Full period: January 1965 – December 2018.

I formed three sin stock portfolios: equal weighted, value weighted, and one that is equal weighted by industry. Sin stocks' performance is compared both to market and to a portfolio formed of stocks belonging to comparable industries (Chapter 3.3).

3.1 Data Sources

The data for this research is collected from four different sources. I utilize data from Compustat Annual and Compustat Segments databases to identify sin stocks by SIC[2] or NAICS[3] code. From CRSP[4] I obtain monthly returns, stock prices and shares outstanding. I also obtain SIC and NAICS codes for identification purposes. To be included in my data sample, a company must be listed in NYSE, Amex or Nashdaq (CRSP exchange code 1, 2 or 3) and have a CRSP share code of 10 or 11.

The risk-free rate, stock market excess return and returns for the SMB (Small Minus Big), HML (High Minus Low) and MOM (Momentum) portfolios are from Kenneth R. French data library[5]. The excess market return is the value-weight return of all CRSP firms listed in

[2] The Standard Industrial Classification
[3] The North American Industry Classification System
[4] Center for Research in Securities Prices
[5] Kenneth R. French data library. https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html, accessed 16.1.2020.

NYSE, Amex or Nasdaq, incorporated in U. S. and having a share code of 10 or 11 net of the risk-free rate (one-month Treasury bill rate)[6].

3.2 Sin stock identification

I use quite similar sin stock identification process as Hong & Kacperzyc (2009). I utilize the Fama and French (1997) industry classification scheme which categorizes SIC codes into 48 industries to identify companies which belong either in alcohol or tobacco industry. The respective groupings in the classification are group 4 (Alcoholic Beverages) consisting of SIC codes 2080-2085 and group 5 (Tobacco Products) consisting of SIC codes 2100-2199 (Fama & French, 1997).

Unfortunately, the classification scheme does not have its own grouping for gambling industry. Therefore, I will use NAICS classification to identify companies involved in gambling industry. NAICS codes used to identify a company that is involved in gambling industry are 7132, 71312, 713210, 71329, 713290, 72112 and 721120.

I use a three-step screening process to identify sin stocks. First, I use the sin stock identification rules to identify sinful companies from Compustat Annual data for a time span from 1965 to 2018. Any company that has a SIC code (alcohol, tobacco) or NAICS code (gambling) that falls in the sin stock categories in certain year, will be identified as a sin stock. In the second step, I search sinful companies from the Compustat Segments data for the timespan from 1976 to 2018. The timespan is shorter because segments level data does not exist before 1976. If any of a firm's segments is categorized as sinful in certain year, the company will be considered as sinful that year. The last step is to utilize the same identification rules for the Center for Research in Securities Prices (CRSP) monthly data for timespan from 1965 to 2018.

[6] Description of Fama/French Factors. https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/f-f_factors.html, accessed 18.1.2020.

After identifying the sin stocks from each database, I form a CUSIP code by year list for each sin industry for each subsample. Then the subsamples are merged to get a unique list of sin companies for each sin industry (alcohol, tobacco and gambling). The last step is to filter out sin stocks which are not listed in NYSE, Amex or Nashdaq (CRSP exchange code 1, 2 or 3) or do not have a CRSP share code of 10 or 11. The yearly distribution of sin stocks is presented in Table 1.

A total of 202 unique sin stocks were identified with the screening process: 93 stocks involved in alcohol industry, 73 stocks involved in gambling industry and 37 involved in tobacco industry. These stocks will be used to form sin portfolios in this study. A list of individual sin stocks with their PERMNO, name, first appearance and last appearance in the sample are provided in Appendix A.

3.3 Comparable stocks

I use the same four industries to form a portfolio of comparable stocks as (Hong & Kacperzcyk, 2009). The comparables are identified by their SIC codes. The industry groups of interest are 2 (food), 3 (soda), 7 (fun) and 43 (meals) (Fama & French, 1997). The meal group includes restaurants and hotels etc. These groups are chosen as comparables as they are most similar to the sin stock groupings.

The identification process of comparables is a lot simpler than the identification process of the sin stocks. To be included in any of my comparable group subsamples, a company must have a SIC code that belongs to the respective group in CRSP at respective

Table 1. Yearly distribution of sin stocks by class.

Year	Alcohol	Gambling	Tobacco	All
1965	18	0	15	32
1966	17	0	15	31
1967	17	0	15	31
1968	16	0	14	29
1969	18	1	11	29
1970	19	1	10	29
1971	20	1	11	31
1972	32	1	12	44
1973	32	2	12	45
1974	29	2	11	41
1975	28	2	11	40
1976	26	2	10	37
1977	26	2	11	38
1978	24	3	11	37
1979	23	5	10	37
1980	25	5	10	39
1981	23	6	9	37
1982	24	7	9	39
1983	25	8	10	42
1984	25	9	10	43
1985	25	10	10	44
1986	24	11	8	42
1987	24	11	8	42
1988	22	12	8	41
1989	23	13	8	43
1990	21	16	7	43
1991	22	15	7	43
1992	22	19	7	47
1993	25	35	6	65
1994	23	41	6	69
1995	28	40	7	74
1996	30	39	11	79
1997	32	37	12	80
1998	31	30	9	70
1999	31	28	9	68
2000	27	26	6	59
2001	24	26	6	56
2002	23	25	5	53
2003	22	25	5	52
2004	23	34	5	62
2005	18	32	5	55
2006	18	32	5	55
2007	17	32	7	56
2008	17	29	9	55
2009	16	28	8	52
2010	17	25	7	49
2011	17	23	7	47
2012	17	23	6	46
2013	17	23	6	46
2014	17	23	8	48
2015	17	17	8	42
2016	17	19	7	43
2017	18	18	7	43
2018	17	17	5	39
Total	**93**	**73**	**37**	**202**

month in the timespan from 1965 to 2018. Also, they must be listed in NYSE, Amex or Nashdaq and have a CRSP share code on 10 or 11.

3.4 Intersections of subsamples

Since three separate databases are used for the identification process, certain stocks fall into more than one industry sample. This is especially problematic with gambling stocks which are identified by NAICS code instead of SIC code. Some companies may have segments operating in sin industries, but the primary SIC code belongs to one of the comparables' industries and thus the company appears in two samples. To overcome this problem, I will remove any stock from the comparables samples that is identified as a sin stock in the same month.

One of the sin stocks appears in both alcohol and tobacco samples (PERMNO 10225) between 1965 and 1997. The sin stock sample is filtered from duplicate rows and thus the stock will not be counted in doubled when analyzing the sin portfolios' performance.

3.5 Time series regressions

To analyze sin stocks' performance, I will perform time series regressions for each time period separately. I form equal and value weighted sin stock portfolios net of risk-free rate to analyze if sin stocks have generated abnormal returns. Additionally, a third sin portfolio is formed. The third portfolio is split by sin industries. Each industry contributes 1/3 share of the portfolio (1/2 alcohol, 1/2 tobacco before Nov 1969) and the shares within industry have equal weight.

The distribution of sin stocks by industry is extremely uneven and varies over time. The structure of the third portfolio smoothens the effect of one industry being over or underrepresented in the sample. The chosen structure also eliminates the possibly significant effect caused by a few large companies which is an issue with value weighted portfolios. The third portfolio also represents a more realistic investment strategy than the structure of the other portfolios.

I will perform four regressions for each portfolio. The most basic version is the CAPM-model. The three other regressions are risk-adjusted with one to three control variables (SMB, HML, MOM). Furthermore, I will run the same four regression with an added

dummy variable *CRISIS* for the full time frame from January 1965 to December 2018. CRISIS has a value of 1 during financial crisis period (Aug 2008 – Mar 2009) and 0 otherwise. Newey & West (1987) standard errors are used to control for heteroscedasticity and autocorrelation in all regression models.

Regression models:

$$P_t = \alpha + \beta_1 (MKT - RF)_t + \varepsilon_t$$

$$P_t = \alpha + \beta_1 (MKT - RF)_{t_t} + \beta_2 SMB_t + \varepsilon_t$$

$$P_t = \alpha + \beta_1 (MKT - RF)_t + \beta_2 SMB_t + \beta_3 HML_t + \varepsilon_t$$

$$P_t = \alpha + \beta_1 (MKT - RF)_t + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 MOM_t + \varepsilon_t$$

$$P_t = \alpha + \beta_1 CRISIS + \beta_i \boldsymbol{X}_{it} + \varepsilon_t$$

where *t* equals a month in the analyzed timespan, *i* is an index between 2 and 5, P is portfolio, ***X*** is some combination of [*MKT-RF, SMB, HML,* MOM], and ε is the error term.

In addition to comparing sin stock returns with the market, I also formed two portfolios long of sin stocks and short of comparables. One portfolio is long in equal weighted sin stock portfolio and short in equal weighted comparables portfolio. The other portfolio is long in value weighted sin stock portfolio and short in value weighted comparables portfolio.

4 Results

The numeric results of the time series regressions are split into four distinct tables:

- Table 2: Sin stock returns net of risk-free rate on sub-periods
- Table 3: Sin stock returns net of risk-free rate on full period
- Table 4: Sin stock portfolios net of comparables on sub-periods
- Table 5: Sin stock portfolios net of comparables on full period

I will start with analyzing the returns of sin stock portfolios net of risk-free rate. First, I will analyze the estimated excess returns on distinct sub-periods: pre-crisis, financial crisis and post-crisis period. Then, I will analyze the full time frame for sin stocks' returns net of risk-free rate. Last, I will analyze the excess returns of portfolios long in sin stocks and short in comparables.

4.1 Sin stocks' sub-period returns net of risk-free rate

I will analyze the sub-periods in chronological order, starting with the pre-crisis period and ending with the post-crisis period.

4.1.1 Pre-crisis period (Jan 1965 - Jul 2008)

As visible in Table 2 - Panel A, the CAPM alpha of equal weighted sin stock portfolio equals 41bps per month and is statistically significant at 5% level. The alpha of the two-factor model equals 33bps per month, being statistically significant at 10% level. The rest of the models generate clearly lower and statistically insignificant alphas [8bps, 19bps].

Interestingly, all alphas of the value weighted portfolio are significant at 1% level and they set in range between 72 and 82bps per month. The results could indicate a few things. One option is that the large companies have performed well and smaller companies not so well during the period. Another option is that some industry, having high market value, performed significantly better than others. Third hypothesis is that an industry, large in number of individual companies, mitigates the returns of other industries in the equal weighted portfolio.

The third portfolio, each industry having equal weight (1/3) and each stock being equally weighted within industry, has alphas in range of 22 to 56bps. Significance varies between 1% significance (CAPM alpha 56bps) and statistical insignificance (3-factor alpha, 22bps). Two-factor alpha (47bps) and four-factor alpha (38bps) are both significant at 5% level. My projection of these results is that tobacco industry, which is low in number, has performed better than the other sin industries during the pre-crisis time period.

Table 2. Sin stock returns net of risk-free rate on sub-periods.

Dependent variable in all time-series regression models is the specified sin portfolio's monthly return net of risk-free rate. Panel A reports time-series regression results of distinct sin stock portfolios for the pre-crisis time period from January 1965 to July 2008. Panel B reports time-series regression results from August 2008 to March 2009, the financial crisis period. Panel C reports time-series regression returns for post-crisis period from April 2009 to December 2018. ALPHA is the estimated excess return. MKPRE is the return of value weighted CRSP index net of risk-free rate. SMB (small minus big), HML (high minus low) and MOM (momentum) are risk factors obtained from Kenneth French data library. Newey-West (1987) standard errors are used in all models to control for heteroscedasticity and autocorrelation. In equal weighted portfolio, every sin stock has equal weight when calculating returns. In value-weighted portfolio, each stocks' return has a weight of stock's market value divided by all sin stocks' combined market value. In 1/3 equal weighted within sin industry portfolio, each stocks' return has a weight of stock's market value divided by the stock's sin industry's (alcohol, gambling, tobacco) market value. Significances: ***1%; **5%; *10%.

Panel A: Sin portfolios Jan 1965 - Jul 2008

	Equal weighted portfolio				Value weighted portfolio				1/3 equal weighted within sin industry			
SIN-RF	1.	2.	3.	4.	1.	2.	3.	4.	1.	2.	3.	4.
ALPHA	0.0041**	0.0033*	0.0008	0.0019	0.0079***	0.0082***	0.0072***	0.0072***	0.0056***	0.0047**	0.0022	0.0038**
	(0.0018)	(0.0017)	(0.0014)	(0.0014)	(0.0018)	(0.0018)	(0.0017)	(0.0018)	(0.0020)	(0.0020)	(0.0016)	(0.0016)
MKTPREM	0.8921***	0.7902***	0.8892***	0.8749***	0.7822***	0.8183***	0.8586***	0.8582***	0.9021***	0.7857***	0.8853***	0.8643***
	(0.0486)	(0.0390)	(0.0431)	(0.0406)	(0.0675)	(0.0644)	(0.0434)	(0.0436)	(0.0557)	(0.0424)	(0.0477)	(0.0471)
SMB		0.4883***	0.5496***	0.5524***		0.1733***	0.1484***	0.1483***		0.5580***	0.6197***	0.6239***
		(0.1498)	(0.0962)	(0.0883)		(0.0638)	(0.0551)	(0.0548)		(0.1756)	(0.1230)	(0.1076)
HML			0.4472***	0.4181***			0.1819*	0.1812			0.4505***	0.4078***
			(0.0842)	(0.0774)			(0.1016)	(0.1135)			(0.1067)	(0.1009)
MOM				-0.1056*				-0.0025				-0.1553**
				(0.0589)				(0.0754)				(0.0732)

Panel B: Sin portfolios Aug 2008 - Mar 2009

	Equal weighted portfolio				Value weighted portfolio				1/3 equal weighted within sin industry			
SIN-RF	1.	2.	3.	4.	1.	2.	3.	4.	1.	2.	3.	4.
ALPHA	-0.0033	-0.0225***	-0.0226***	-0.0536***	0.0049	0.0042	0.0048	0.0104***	0.0056	-0.0086	-0.0083	-0.0355***
	(0.0154)	(0.0036)	(0.0033)	(0.0032)	(0.0052)	(0.0040)	(0.0058)	(0.0017)	(0.0125)	(0.0072)	(0.0047)	(0.0048)
MKTPREM	1.1726***	0.8380***	0.8467***	0.3139**	0.8034***	0.7929***	0.6964***	0.7936***	1.0407***	0.7953***	0.7553***	0.2877***
	(0.1759)	(0.0346)	(0.0518)	(0.0608)	(0.0304)	(0.0396)	(0.0736)	(0.0271)	(0.0920)	(0.0530)	(0.0430)	(0.0487)
SMB		1.8954***	1.8894***	1.6051**		0.0595	0.1252	0.1771***		1.3905***	1.4177***	1.1681
		(0.0814)	(0.0628)	(0.4489)		(0.0754)	(0.2262)	(0.0059)		(0.0579)	(0.0355)	(0.5055)
HML			-0.0244	-0.0927			0.2709***	0.2834***			0.1121	0.0521
			(0.2297)	(0.1398)			(0.0330)	(0.0251)			(0.2121)	(0.1227)
MOM				-0.8484***				0.1548**				-0.7446***
				(0.0903)				(0.0361)				(0.0966)

Panel C: Sin portfolios Apr 2009 - Dec 2018

	Equal weighted portfolio				Value weighted portfolio				1/3 equal weighted within sin industry			
SIN-RF	1.	2.	3.	4.	1.	2.	3.	4.	1.	2.	3.	4.
ALPHA	0.0039	0.0052*	0.0059*	0.0066*	0.0063***	0.0053**	0.0052**	0.0053**	0.0041	0.0052*	0.0057**	0.0062*
	(0.0033)	(0.0030)	(0.0031)	(0.0038)	(0.0024)	(0.0022)	(0.0021)	(0.0020)	(0.0032)	(0.0031)	(0.0027)	(0.0035)
MKTPREM	1.2077***	1.0578***	1.0173***	0.8784***	0.7688***	0.8832***	0.8944***	0.8688***	1.0581***	0.9296***	0.9008***	0.8080***
	(0.0678)	(0.0685)	(0.0721)	(0.0690)	(0.0533)	(0.0513)	(0.0601)	(0.0633)	(0.0692)	(0.0751)	(0.0587)	(0.0727)
SMB		0.6245***	0.5966***	0.6308***		-0.4765***	-0.4688***	-0.4625***		0.5354***	0.5156***	0.5384***
		(0.1495)	(0.1456)	(0.1560)		(0.1240)	(0.1179)	(0.1197)		(0.1445)	(0.1094)	(0.1321)
HML			0.3556**	-0.0911			-0.0985	-0.1808			0.2527	-0.0458
			(0.1557)	(0.1689)			(0.1205)	(0.1258)			(0.1641)	(0.1463)
MOM				-0.5701***				-0.1050*				-0.3809***
				(0.0781)				(0.0594)				(0.0673)

4.1.2 Financial crisis (Aug 2008 – Mar 2009)

During financial crisis, equal weighted portfolio generated negative alphas (Table 2 – Panel B). CAPM model has an alpha of -33bps and is insignificant, whereas all other alphas are significant in 1% level and range between -536bps (-5.36%, 4-factor alpha) and -225bps (-2.25%) per month, -64.32% to -27.00% per year.

Value weighted portfolio on the other hand generates positive alphas. 4-factor alpha of 104bps per month is significant at 1% level whereas the rest of the alphas are substantially lower ranging from 42 to 49bps per month. The conflicting results between equal and value weighted portfolios indicate that most sin stocks have performed extremely badly whereas the large companies have performed relatively well during financial crisis. However, the lack of significance weakens the credibility of the results.

The third portfolio generates positive but insignificant CAPM alpha of 56bps per month. Two-factor alpha (-86bps) and three-factor alpha (-83bps) are negative but insignificant. The four-factor alpha (-355bps or -3.55%) is significant at 1% level. In general, the alphas of the third portfolio interpose between the alphas of equal and value weighted portfolios. This result indicates that considerable differences in returns existed between the three sin industries at the time of financial crisis.

Figures 1 and 2 illustrate the uneven weights of each sin industry in equal and value weighted portfolios. The equal weighted portfolio is dominated by gambling stocks whereas the value weighted portfolio is dominated by tobacco stocks. Reflecting these findings to the regression results, it seems likely that gambling stocks are the main reason for the bad performance of the equal weighted sin portfolio.

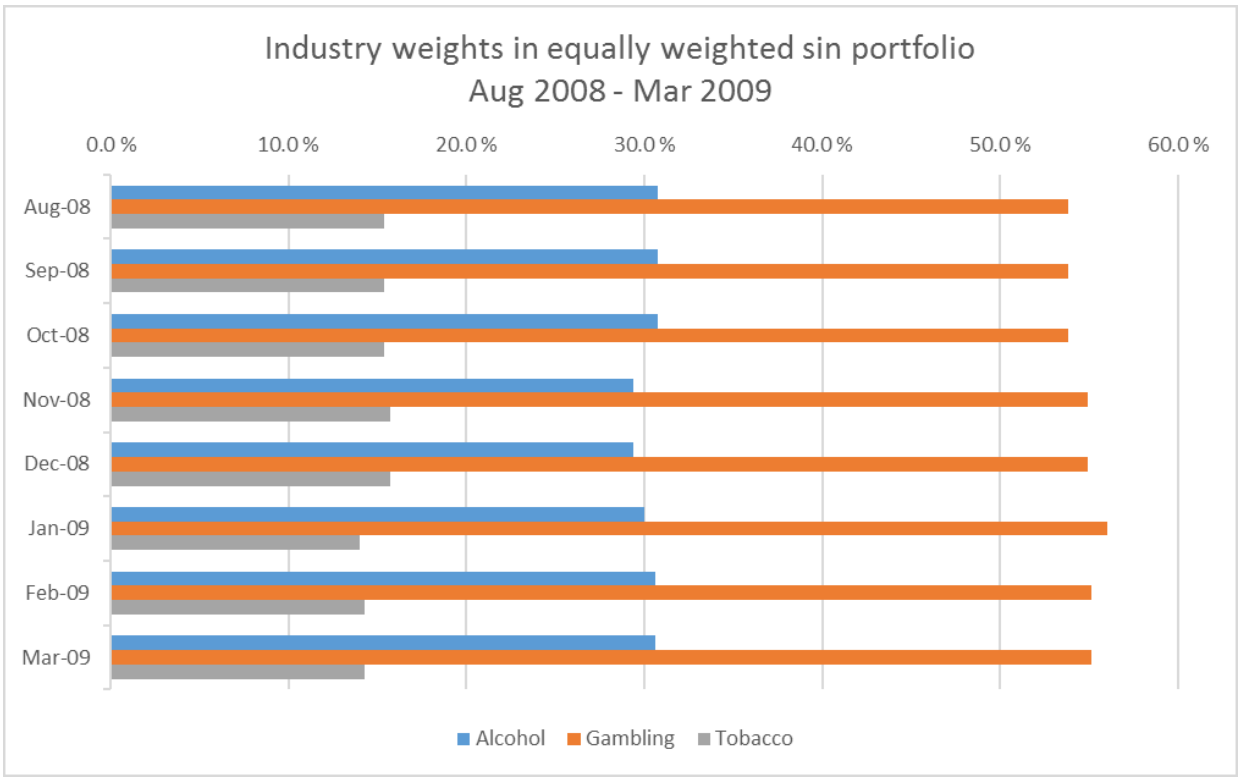

Figure 1. Monthly weight of each sin industry during the financial crisis in equal weighted portfolio.

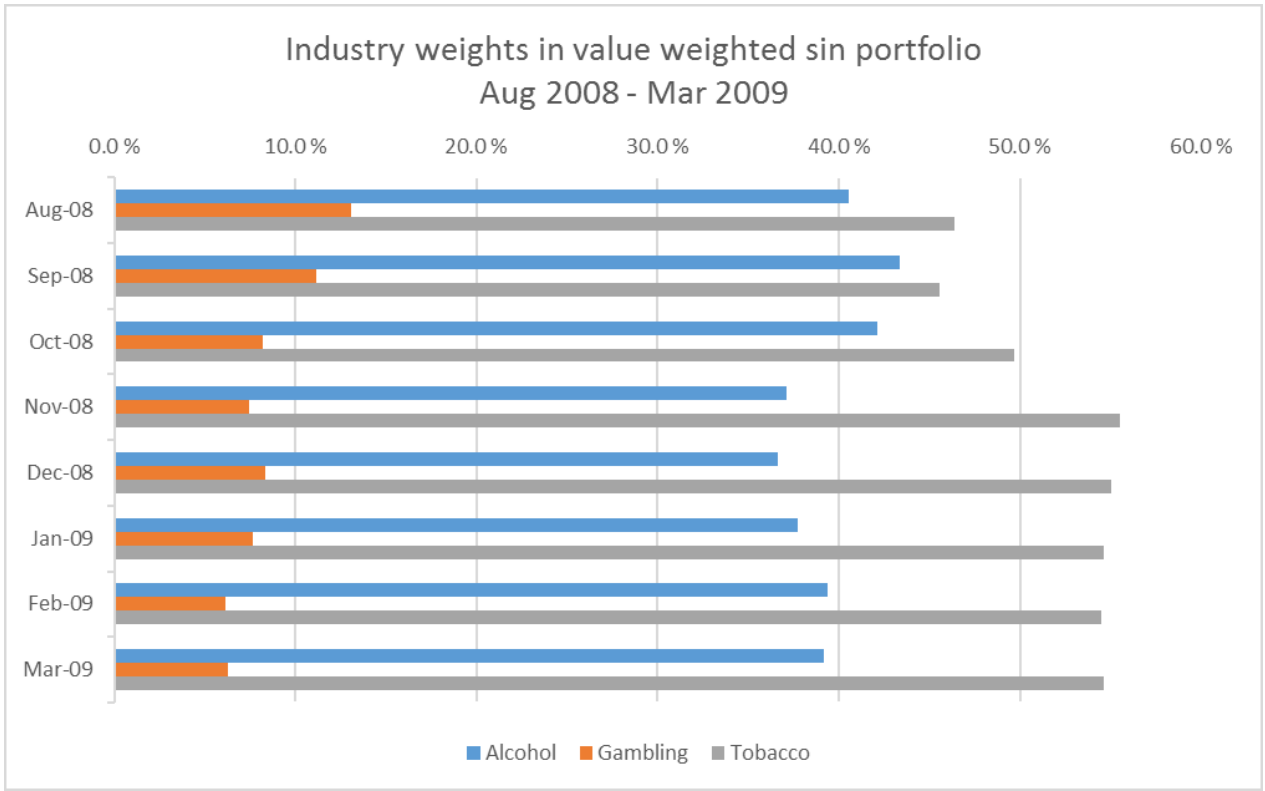

Figure 2. Monthly weight of each sin industry during the financial crisis in value weighted portfolio.

Gambling stocks have little effect on value weighted portfolio and thus it seems likely that tobacco industry and maybe alcohol industry have been able to generate positive abnormal returns during the crisis.

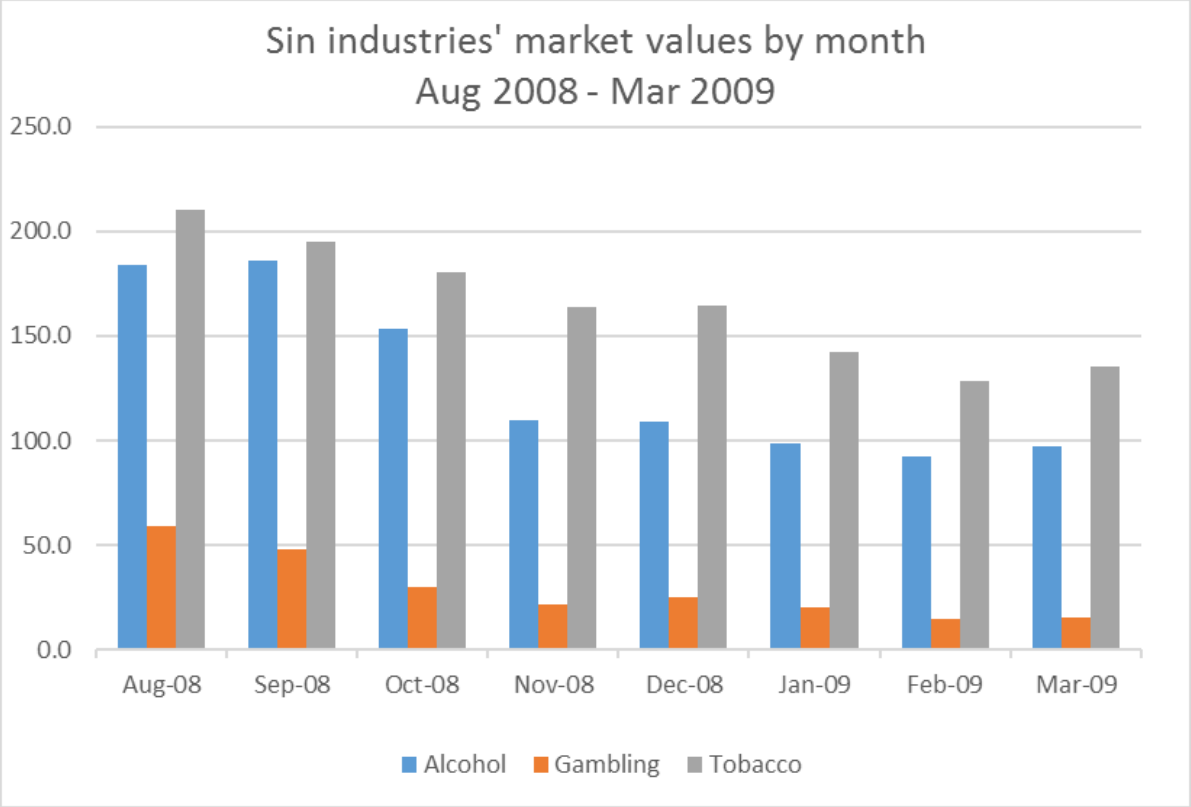

Figure 3. Monthly market value of each sin industry during the financial crisis in billions of US dollars.

Figure 3 represents the market values of each sin industry by month during the financial crisis. It is clearly visible that gambling industry lost value at a much higher rate than the other sin industries. In fact, gambling industry lost roughly 73.8% of its market value during the crisis, whereas tobacco industry lost 35.7% and alcohol industry lost 47.2% of their market values during the crisis. Also visible are the large differences in industries market values which directly causes the low industry weight of gambling industry inside the value weighted portfolio.

4.1.3 Post-crisis period (April 2009 – Dec 2018)

All portfolios generate positive alphas in the range of 39 to 66bps per month (Table 2 – Panel C). Excluding CAPM alphas, all other alphas interpose between 52 (0.52%) and 66bps (0.66%) per month and are significant either at 5% level or 10% level.

According to these results, it seems likely that after the financial crisis, all sin industries began to generate abnormal returns. As the observed alphas of the three portfolios are so close to another, I would assume that the differences in capabilities of generating abnormal returns between industries have smoothened after the crisis. Also, the differences between large and small companies' returns seem to have smoothened. It seems evident that sin stocks have clearly outperformed the market in the post-crisis period.

4.2 Sin stock excess returns - full time frame (Jan 1965 – Dec 2018)

I used the same regression models as with the sub-periods to run regressions for the full time period from January 1965 to December 2018. The results are visible in Table 3 – Panel A. The results are mainly significant and provide strong evidence that sin stocks have been able to generate abnormal returns in the long term. Equal weighted portfolio generated following alphas [42***, 36**, 18, 35**] bps. CAPM alpha is significant at 1% level whereas two-factor and four-factor alphas are significant at 5% level. Interestingly, three-factor alpha is insignificant.

As in line with the previous findings, value weighted portfolio generates significantly higher alphas ranging between 73 and 78bps (Table 3 – Panel A). This indicates that value weighted portfolio has generated roughly twice as high excess returns ass the equal weighted portfolio. Furthermore, all alphas are significant at 1% level.

The third portfolio has alphas ranging between 32 and 54bps. Three-factor alpha is significant at 5% level, all others are significant at 1% level. Again, alphas set between those of equal weighted and value weighted portfolios. It seems even more convincing that large sin companies are able to generate higher excess returns and that there are substantial differences between sin industries' capability of generating excess returns.

To study if the excess returns dropped due to the financial crisis, I ran the same regressions with an added dummy variable CRISIS which has the value of one during the financial crisis period (Aug 2008 – Mar 2009) and zero otherwise. The results are visible in Table 3 – Panel B. The alphas are almost exactly the same both by value and by statistical significance as in the corresponding regressions without the dummy variable (Panel A) and thus do not merit further discussion. However, the estimated values of the crisis coefficient are highly interesting.

Table 3. Sin stock returns net of risk-free rate - full period**.**
Dependent variable in all time-series regression models is the specified sin portfolio's monthly return net of risk-free rate. Panel A reports time-series regression results of distinct sin stock portfolios from January 1965 to December 2018. Panel B reports time-series regression results from January 1965 to December 2018 including dummy variable for the financial crisis period. ALPHA is the estimated excess return. CRISIS is a dummy indicator for financial crisis. It has a value of one during crisis period (Aug 2008 – Mar 2009) and zero otherwise. MKPRE is the return of value weighted CRSP index net of risk-free rate. SMB (small minus big), HML (high minus low) and MOM (momentum) are risk factors obtained from Kenneth French data library. Newey-West (1987) standard errors are used in all models to control for heteroscedasticity and autocorrelation. In equal weighted portfolio, every sin stock has equal weight when calculating returns. In value-weighted portfolio, each stocks' return has a weight of stock's market value divided by all sin stocks' combined market value. In 1/3 equal weighted within sin industry portfolio, each stocks' return has a weight of stock's market value divided by the stock's sin industry's (alcohol, gambling, tobacco) market value. Significances: ***1%; **5%; *10%.

Panel A: Sin stock portfolios net of risk-free rate Jan 1965 - Dec 2018

	Equal weighted portfolio				Value weighted portfolio				1/3 equal weighted within sin industry			
SIN-RF	1.	2.	3.	4.	1.	2.	3.	4.	1.	2.	3.	4.
ALPHA	0.0042***	0.0036**	0.0018	0.0035**	0.0076***	0.0078***	0.0073***	0.0074***	0.0054***	0.0048***	0.0032**	0.0048***
	(0.0016)	(0.0015)	(0.0014)	(0.0015)	(0.0015)	(0.0016)	(0.0014)	(0.0015)	(0.0017)	(0.0017)	(0.0014)	(0.0014)
MKTPREM	0.9541***	0.8504***	0.9121***	0.8760***	0.7815***	0.8231***	0.8412***	0.8395***	0.9306***	0.8159***	0.8720***	0.8367***
	(0.0515)	(0.0496)	(0.045)	(0.0336)	(0.0556)	(0.0531)	(0.0382)	(0.0375)	(0.0492)	(0.0426)	(0.0396)	(0.0382)
SMB		0.5039***	0.5544***	0.5576***		0.2022***	0.1874***	0.1873***		0.5573***	0.6033***	0.6065***
		(0.1347)	(0.0979)	(0.0796)		(0.0559)	(0.0501)	(0.0498)		(0.1566)	(0.1018)	(0.0995)
HML			0.4325***	0.3634***			0.1267	0.1234			0.3941***	0.3263***
			(0.0918)	(0.0752)			(0.0886)	(0.0971)			(0.0806)	(0.0926)
MOM				-0.1944**				-0.0092				0.1907***
				(0.0919)				(0.0629)				(0.0726)

Panel B: Sin stock portfolios net of risk-free rate with crisis dummy Jan 1965 - Dec 2018

	Equal weighted portfolio				Value weighted portfolio				1/3 equal weighted within sin industry			
SIN-RF	1.	2.	3.	4.	1.	2.	3.	4.	1.	2.	3.	4.
ALPHA	0.0045**	0.0039***	0.002	0.0038**	0.0076***	0.0078***	0.0072***	0.0073***	0.0055***	0.0049***	0.0031**	0.0049***
	(0.002)	(0.0015)	(0.0013)	(0.0015)	(0.0015)	(0.0016)	(0.0014)	(0.0015)	(0.0021)	(0.0017)	(0.0015)	(0.0015)
CRISIS	-0.0191***	-0.0246***	-0.0107	-0.0167***	-0.0039	-0.0018	0.0024	0.0021	-0.0056	-0.0116*	0.0012	-0.0046
	(0.0068)	(0.0084)	(0.0106)	(0.0043)	(0.0074)	(0.0063)	(0.0054)	(0.0062)	(0.0064)	(0.0065)	(0.0068)	(0.0055)
MKTPREM	0.9475***	0.8411***	0.9072***	0.8677***	0.7802***	0.8225***	0.8423***	0.8405***	0.9286***	0.8115***	0.8726***	0.8344***
	(0.062)	(0.0455)	(0.0425)	(0.0368)	(0.0436)	(0.0505)	(0.0379)	(0.0382)	(0.0543)	(0.0415)	(0.0403)	(0.0388)
SMB		0.5075***	0.5553***	0.5591***		-0.2019***	-0.1876***	-0.1875***		0.5590***	0.6032***	0.6069***
		(0.1336)	(0.0931)	(0.0826)		(0.0547)	(0.0501)	(0.0498)		(0.1506)	(0.106)	(0.094)
HML			0.4268***	0.3532***			0.1279	0.1247			0.3947***	0.3235***
			(0.0843)	(0.1066)			(0.085)	(0.0986)			(0.0847)	(0.0849)
MOM				-0.1980**				-0.0088				-0.1917***
				(0.0919)				(0.0633)				(0.074)

All estimates for crisis coefficients of the equal weighted portfolio (Panel B) are significant at 1% level except the three-factor crisis coefficient (-107bps) which is statistically insignificant. Other estimates range between -246bps (-2.46%) and -167bps (-1.67%) per month, meaning that during the crisis, equal weighted portfolio's excess returns were that much less monthly than outside of the financial crisis period. Comparing crisis coefficients with alphas, it is easy to see that equal weighted portfolio generated highly negative abnormal returns during crisis: ALPHA + CRISIS = [-146, -207, -105, -129] bps.

The estimates for crisis coefficients for the value weighted portfolio vary between -39 and 24bps, and all of them are statistically insignificant. Similarly, the crisis estimates for the third portfolio are all insignificant except for two-factor model (-116bps) which is significant at 10% level. Therefore, the null hypotheses of crisis coefficient equaling zero holds for the value weighted portfolio and the equal weighted by industry portfolio. Since all alphas are positive and statistically significant, it seems that these sin portfolios were able to generate positive abnormal returns during the crisis.

4.3 Sin stock portfolios net of comparable stocks

The results of the sin stock portfolios net of comparables regressions during sub-periods are presented in Table 4. Unlike Hong & Kacperzcyk (2009), I was unable to find evidence that sin stocks had outperformed comparables. All alphas for equal weighted portfolio during pre-crisis period are positive ranging between 16 and 24bps (Table 4 – Panel A). However, all of them are statistically insignificant except two-factor alpha (24bps) which is significant at 10% level. Alphas of the value weighted portfolio range between 9 and 14bps and they are statistically insignificant. Therefore, null hypotheses cannot be rejected, and it appears that sin stocks have performed just as well as their comparables before the financial crisis.

The results during financial crisis are catastrophic (Table 4 – Panel B). The basic model's alpha of the equal weighted portfolio suggests -271bps (-2.71%) returns per month. It is not statistically significant, but the risk-adjusted alphas are significant at 1% level suggesting an even worse performance between -347bps (-3.47%) and -305bps (-3.05%) abnormal returns per month. To put in context, it corresponds abnormal returns of -41.64% to -36.6% per year.

Table 4. Sin portfolios net of comparables - sub-periods.

Dependent variable in all time-series regression models is a portfolio's monthly return that is long in sin stocks and short in comparable stocks. Panel A reports time-series regression results of distinct sin stock portfolios for the pre-crisis time period from January 1965 to July 2008. Panel B reports time-series regression results from August 2008 to March 2009, the financial crisis period. Panel C reports time-series regression returns for post-crisis period from April 2009 to December 2018. ALPHA is the estimated excess return. MKPRE is the return of value weighted CRSP index net of risk-free rate. SMB (small minus big), HML (high minus low) and MOM (momentum) are risk factors obtained from Kenneth French data library. Newey-West (1987) standard errors are used in all models to control for heteroscedasticity and autocorrelation. In equal weighted portfolio, every sin stock (comparable stock) has equal weight when calculating returns. In value-weighted portfolio, each stocks' return has a weight of stock's market value divided by all sin (comparable) stocks' combined market value. Significances: ***1%; **5%; *10%.

Panel A: SIN-COMP Jan 1965 - Jul 2008

	Equal weighted portfolio				Value weighted portfolio			
SIN-COMP	1.	2.	3.	4.	1.	2.	3.	4.
ALPHA	0.0019	0.0024*	0.0022	0.0016	0.0012	0.0014	0.0012	0.0009
	(0.0015)	(0.0014)	(0.0014)	(0.0014)	(0.0014)	(0.0014)	(0.0014)	(0.0015)
MKTPREM	-0.0565*	0.0038	0.0139	0.0212	0.1013***	-0.0761**	-0.0692*	-0.0649
	(0.0331)	(0.0303)	(0.0327)	(0.0329)	(0.036)	(0.0386)	(0.0394)	(0.0394)
SMB		0.2890***	0.2828***	0.2842***		-0.1208**	-0.1166*	-0.1174**
		(0.0468)	(0.0468)	(0.0424)		(0.0584)	(0.0641)	(0.0597)
HML			0.0456	0.0604			0.0313	0.04
			(0.0532)	(0.061)			(0.0692)	(0.0663)
MOM				0.0537				0.0315
				(0.0504)				(0.0445)

SIN-COMP Aug 2008 - Mar 2009

	Equal weighted portfolio				Value weighted portfolio			
SIN-COMP	1.	2.	3.	4.	1.	2.	3.	4.
ALPHA	-0.0271	-0.0347***	-0.0344***	-0.0305***	-0.0139	-0.0117	-0.0114	-0.0056
	(0.0142)	(0.0027)	(0.0025)	(0.0049)	(0.0143)	(0.0141)	(0.0064)	(0.0142)
MKTPREM	-0.1282	-0.2617***	-0.3261	-0.2598	-0.0003	0.0391	-0.0127	0.0866
	(0.0735)	(0.0471)	(0.1554)	(0.1701)	(0.0566)	(0.0518)	(0.0712)	(0.2143)
SMB		0.7564*	0.8003	0.8357		-0.2233	-0.1880	-0.1350**
		(0.3705)	(0.8089)	(0.6596)		(0.1916)	(0.1282)	(0.0321)
HML			0.1809	0.1894			0.1455	0.1583
			(0.1747)	(0.1667)			(0.1184)	(0.0815)
MOM				0.1056				0.1581
				(0.1533)				(0.1932)

SIN-COMP Apr 2009 - Dec 2018

	Equal weighted portfolio				Value weighted portfolio			
SIN-COMP	1.	2.	3.	4.	1.	2.	3.	4.
ALPHA	-0.0002	0.0001	0.0004	0.0008	-0.0027	-0.0032*	-0.0031*	-0.0030*
	(0.0029)	(0.0032)	(0.0031)	(0.0032)	(0.0019)	(0.0018)	(0.0018)	(0.0017)
MKTPREM	0.2291***	0.1879**	0.1677**	0.1045	0.0918**	0.1479***	0.1446***	0.1191*
	(0.0573)	(0.0721)	(0.0789)	(0.0715)	(0.0419)	(0.0483)	(0.0551)	(0.0625)
SMB		0.1714	0.1574	0.1730		-0.2335**	-0.2358**	-0.2296**
		(0.1542)	(0.1563)	(0.1507)		(0.0952)	(0.0931)	(0.0905)
HML			0.1780	-0.0251			0.0294	-0.0526
			(0.1357)	(0.1414)			(0.1210)	(0.0926)
MOM				-0.2592***				-0.1046***
				(0.0512)				(0.0347)

Based on the previous results on equal weighted sin stock portfolio net of risk-free rate (Table 2 – Panel B), these results did not come as a surprise. The sin portfolio in question performed extremely badly which could explain a lot of these results rather than comparables' good performance. Value weighted portfolio has alphas in range -139bps (-1.39%) and -56bps (-0.56%) per month. None of the results are significant at any reasonable level and thus the null hypotheses of value weighted sin stock portfolio performing equally well as value weighted comparables portfolio cannot be rejected.

After the financial crisis, the alphas of the equal weighted portfolio range between -2 and 8bps per month (Table 4 – Panel C), none of them being significant at any reasonable level. It appears that the portfolio's returns do not differ from the returns of the comparables portfolio. In contrast to the equal weighted portfolio, disregarding the CAPM-alpha (-27bps, insignificant), value weighted portfolio has alphas between -32 and -30bps each significant at the 10% level. The significance level of 10% leaves doubts but it appears that the value weighted sin portfolio has performed seemingly worse than that of comparables after financial crisis.

The regression results for full time period from January 1965 to December 2018 (Table 5) support earlier observations that sin stocks do not seem to outperform their comparables. All alphas are statistically insignificant and also have low values (Panel A). Adding the crisis variable (Panel B) does not improve significance. Since the sin stocks do not outperform their comparables, sin stocks' abnormal returns cannot be explained by deficit of arbitrage capital in the financial markets caused by social norms.

Table 5. Sin portfolios net of comparables - full period.

Dependent variable in all time-series regression models is a portfolio's monthly return that is long in sin stocks and short in comparable stocks. Panel A reports time-series regression results of distinct portfolios from January 1965 to December 2018. Panel B reports time-series regression results from January 1965 to December 2018 including dummy variable for the financial crisis period. ALPHA is the estimated excess return. CRISIS is a dummy indicator for financial crisis. It has a value of one during crisis period (Aug 2008 – Mar 2009) and zero otherwise. MKPRE is the return of value weighted CRSP index net of risk-free rate. SMB (small minus big), HML (high minus low) and MOM (momentum) are risk factors obtained from Kenneth French data library. Newey-West (1987) standard errors are used in all models to control for heteroscedasticity and autocorrelation. In equal weighted portfolio, every sin stock (comparable stock) has equal weight when calculating returns. In value-weighted portfolio, each stocks' return has a weight of stock's market value divided by all sin (comparable) stocks' combined market value. Significances: ***1%; **5%; *10%.

Panel A: Sin stocks - comperables portfolios Jan 1965 - Dec 2018

	Equal weighted portfolio				Value weighted portfolio			
SIN-COMP	1.	2.	3.	4.	1.	2.	3.	4.
ALPHA	0.0016	0.0019	0.0014	0.0015	0.0005	0.0006	0.0004	0.0003
	(0.0014)	(0.0013)	(0.0013)	(0.0013)	(0.0012)	(0.0012)	(0.0012)	(0.0012)
MKTPREM	-0.0122	0.0367	0.0528*	0.0519*	-0.0661**	-0.0388	-0.0292	-0.0276
	(0.0323)	(0.0280)	(0.0280)	(0.0274)	(0.0330)	(0.0347)	(0.0345)	(0.0335)
SMB		-0.2376***	-0.2244***	-0.2243***		-0.1327**	-0.1248*	-0.1250**
		(0.0477)	(0.0482)	(0.0436)		(0.0568)	(0.0642)	(0.0562)
HML			0.1135**	0.1117**			0.0673	0.0703
			(0.0507)	(0.0534)			(0.0585)	(0.0573)
MOM				-0.0051				0.0084
				(0.0579)				(0.0402)

Panel B: Sin stocks - comperables portfolios with crisis dummy Jan 1965 - Dec 2018

	Equal weighted portfolio				Value weighted portfolio			
SIN-COMP	1.	2.	3.	4.	1.	2.	3.	4.
ALPHA	0.0020	0.0022*	0.0017	0.0018	0.0007	0.0009	0.0006	0.0006
	(0.0014)	(0.0013)	(0.0013)	(0.0014)	(0.0011)	(0.0012)	(0.0011)	(0.0011)
CRISIS	-0.0236**	-0.0211	-0.0177	-0.0179	-0.0183***	-0.0169***	-0.0150***	-0.0148***
	(0.0115)	(0.0149)	(0.0136)	(0.0134)	(0.0032)	(0.0034)	(0.0036)	(0.0035)
MKTPREM	-0.0204	0.0287	0.0448*	0.0431	-0.0725*	-0.0452	-0.0360	-0.0349
	(0.0324)	(0.0256)	(0.0262)	(0.0300)	(0.0416)	(0.0412)	(0.0367)	(0.0369)
SMB		-0.2345***	-0.2229***	-0.2227***		-0.1302**	-0.1235*	-0.1236*
		(0.0442)	(0.0463)	(0.0493)		(0.0625)	(0.0668)	(0.0671)
HML			0.1041**	0.1008*			0.0594	0.0613
			(0.0473)	(0.0554)			(0.0574)	(0.0632)
MOM				-0.0089				0.0052
				(0.0628)				(0.0398)

5 Summary

In this work, I was able to find evidence that sin stocks have been able to generate positive abnormal returns in a long term. All results indicate however, that the universe of sin stocks as determined, is quite heterogenous. Therefore, equal weighted portfolios tend to perform reasonably differently from the value weighted portfolios.

I found evidence that the equal weighted sin stock portfolio which best represents the sin stock universe overall, underperformed significantly during the financial crisis. This result is in line with my original hypotheses for the first research question. However, the value weighted sin portfolio, in light of the results kept on outperforming the market even during the crisis which is against my hypotheses. My hypotheses relied on the earlier findings that sin stocks do not have as strong institutional ownership as do other companies (Hong & Kacperzcyk, 2009). Therefore, their returns would be more affected during a crisis as small-scale investors get rid of the stocks. Also, Lins et al. (2017) found evidence that high CSR firms outperformed low CSR firms during the crisis. Sin stocks tend to belong to the second group. However, based on the contrary results during financial crisis, there must be some other factors, too, driving the results.

I believe that the main reason is that the value weighted portfolio is dominated by large alcohol and tobacco stocks and the equal weighted portfolio is dominated by smaller gambling stocks. Alcohol and tobacco industries are quite similar. Both have long history and business models benefit from economies of scale and thus the industries are dominated by small number of large operators. Products are mostly bulk, and the customer base is wide and loyal. On the other hand, gambling industry is younger and spread to multiple smaller operators. Also, casino visits are expensive, and at a time of crisis, consumers have less capital available for fun activities. This assumption is in line with Maslow's hierarchy of needs (Maslow, 1943). Human need to fulfill their basic needs before less crucial needs.

The answer to the second research question *Q2: Have the excess returns of sin stocks restored to similar level they were before the crisis?* is yes. Alphas in pre-crisis period (Table 2 – Panel A) are similar to those of the full time period (Table 3 – Panels A & B). This result is against the efficient market hypotheses since sin stocks' capability of generating abnormal returns has been long known. Hong & Kacperczyk (2009) suggest that the excess returns could be explained by the fact that sin stocks are neglected by

certain investors due to social norms and that there is not enough arbitrage capital to eliminate the price effects. However, my results on portfolios long in sin stocks and short in comparables indicate that the comparable stocks perform just as well as sin stocks in the long run. These results indicate strongly that there must be some other explanation for the abnormal returns than the lack of arbitrage capital caused by social norms.

6 Conclusion

The results that I found were partly surprising. First, the fact that sin stocks have kept on outperforming after the financial crisis similarly as before the crisis, although the capability of sin stocks providing abnormal returns has been long known already, violates the efficient market hypothesis. Even more surprising is the finding that sin stocks' performance and comparable stocks' performance does not seem to differ from one another. This sets in doubt the assumption of the lack of arbitrage capital derived from social norms as a plausible explanation.

Further research is needed to find out the underlying elements causing the abnormal returns of sin stocks. I suggest investigating the gambling industry separately from the other two sin industries since the characteristics differ so largely. Therefore, it is also likely that the elements causing the abnormal returns differ largely as well between sin industries.

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Appendix A: List of Sin Stocks (1965-2018)

PERMNO	Company name	First year	Last year	Sin class
14523	22ND CENTURY GROUP INC	2014	2017	Tobacco
11307	A & W BRANDS INC	1987	1993	Alcohol
85156	ADVANCED TOB PRODS INC	1984	1992	Tobacco
84284	ALMADEN VINEYARDS INC DE	1972	1973	Alcohol
13901	ALTRIA GROUP INC	1965	2018	Tobacco
17670	AMDISCO CORP	1965	1980	Alcohol
12897	AMERICAN FUEL TECHNOLOGIES INC	1983	1987	Alcohol
83479	AMERICAN WAGERING INC	1996	2000	Gambling
79795	AMERISTAR CASINOS INC	1993	2013	Gambling
80153	ANCHOR GAMBLING	1994	2001	Gambling
59184	ANHEUSER BUSCH COS INC	1972	2008	Alcohol
78867	ARGOSY GAMBLING CO	1993	2005	Gambling
19764	ARMADA CORP	1965	1989	Alcohol
89890	ASCONI CORP	2003	2004	Alcohol
14993	AXION POWER INTERNATIONAL INC	2014	2016	Tobacco
75900	AZTAR CORP	1989	2007	Gambling
16353	BACARDI CORP	1983	1986	Alcohol
38149	BALLY TECHNOLOGIES INC	2004	2014	Gambling
80801	BALLYS GRAND INC	1994	1996	Gambling
50489	BARTON BRANDS INC	1970	1972	Alcohol
10727	BAYUK CIGARS INC	1965	1986	Tobacco
10225	BEAM INC	1965	2013	Alcohol/Tobacco
28329	BEAM J B DISTILLING CO	1965	1967	Alcohol
85456	BERINGER WINE ESTATES HLDGNS INC	1997	2000	Alcohol
79153	BLACK HAWK GAMBLING & DEV CO INC	1993	2000	Gambling
80225	BOARDWALK CASINO INC	1994	1997	Gambling
78021	BOOMTOWN INC	1992	1996	Gambling
82634	BOSTON BEER INC	1995	2018	Alcohol
18893	BOULDER BREWING CO	1983	1983	Alcohol
79758	BOYD GAMBLING CORP	1993	2018	Gambling
29938	BROWN FORMAN CORP	1965	2018	Alcohol
29946	BROWN FORMAN CORP	1965	2018	Alcohol
11766	C A BLOCKERS INC	1987	1989	Tobacco
13267	CAESARS ENTERTAINMENT CORP	2012	2018	Gambling
86447	CAESARS ENTERTAINMENT INC	1999	2004	Gambling
62818	CAESARS NEW JERSEY INC	1979	1990	Gambling
49402	CAESARS WORLD INC	1969	1994	Gambling
81182	CANTERBURY PARK HOLDING CORP	1994	2018	Gambling
76546	CAPITAL GAMBLING INTL INC	1990	1995	Gambling
38922	CARDIFF EQUITIES CORP	1969	1982	Alcohol
83851	CARIBBEAN CIGAR CO	1996	1998	Tobacco
10543	CARIBBEAN SELECT INC	1988	1991	Alcohol

23106	CARLING OKEEFE LTD	1965	1987	Alcohol
78023	CASINO MAGIC CORP	1992	1997	Gambling
91192	CASTLE BRANDS INC	2006	2018	Alcohol
79791	CENTURY CASINOS INC	1993	2018	Gambling
22569	CHALONE WINE GROUP LTD	1984	2005	Alcohol
93302	CHINA RECYCLING ENERGY CORP	2010	2018	Alcohol
79026	CHURCHILL DOWNS INC	1993	2018	Gambling
11995	COCA COLA BOTTLING CO CONS	1982	2018	Alcohol
81478	COLORADO CASINO RESORTS INC	1995	1998	Gambling
24732	COLORADO GASAHOL INC	1980	1985	Alcohol
11391	CONSOLIDATED CIGAR CORP	1965	1968	Tobacco
83819	CONSOLIDATED CIGAR HOLDINGS INC	1996	1999	Tobacco
64899	CONSTELLATION BRANDS INC	1973	2018	Alcohol
69796	CONSTELLATION BRANDS INC	1986	2018	Alcohol
82791	CONTIFINANCIAL CORP	1996	1997	Alcohol
11498	CONWOOD CORP	1965	1985	Tobacco
82176	CRAFT BREW ALLIANCE INC	1995	2018	Alcohol
77984	CRUZAN INTERNATIONAL INC	1992	2006	Alcohol
12044	CULBRO CORP	1965	1997	Tobacco
19828	D W G CORP	1965	1967	Tobacco
89332	DOVER DOWNS GAMBLING & ENTMT INC	2002	2018	Gambling
78864	DR PEPPER SEVEN UP CO INC	1993	1993	Alcohol
25339	DREWRYS LTD USA INC	1965	1966	Alcohol
16887	EASTSIDE DISTILLING INC	2017	2018	Alcohol
14882	ELDORADO RESORTS INC	2014	2018	Gambling
32265	ELI SECURITIES CO	1977	1978	Tobacco
79790	EMPIRE RESORTS INC	1993	2018	Gambling
77446	ESKIMO PIE CORP	1992	1999	Alcohol
23683	FALSTAFF BREWING CORP	1965	1989	Alcohol
91079	FORTUNET INC	2008	2010	Gambling
37613	FRANZIA BROTHERS WINERY	1972	1973	Alcohol
83240	FREDERICK BREWING CO	1996	1999	Alcohol
79490	FULL HOUSE RESORTS INC	1993	2018	Gambling
93069	FUTURE FINTECH GROUP INC	2009	2018	Alcohol
88925	G B HOLDINGS INC	2001	2004	Gambling
85550	GAMETECH INTERNATIONAL INC	2006	2011	Gambling
78887	GAMBLING CORP OF AMERICA	1993	1995	Gambling
76486	GEMINEX INDUSTRIES INC	1990	1990	Gambling
84580	GENERAL CIGAR HOLDINGS INC	1997	2000	Tobacco
38608	GENESEE CORP	1972	2004	Alcohol
24512	GLEN ALDEN CORP	1971	1972	Alcohol
32256	GLENMORE DISTILLERIES CO	1965	1991	Alcohol
86578	GOLDEN ENTERTAINMENT INC	1999	2018	Gambling
86301	GOLDEN STATE VINTNERS INC	1998	2004	Alcohol
77028	GRAND CASINOS INC	1991	1997	Gambling
80551	GRAND GAMBLING CORP	1994	1994	Gambling

76482	GRIFFIN GAMBLING & ENTMT INC	1990	1995	Gambling
76090	HARRAHS ENTERTAINMENT INC	2004	2008	Gambling
42630	HARUCAL INC	1965	1974	Alcohol
80199	HARVEYS CASINO RESORTS	1994	1998	Gambling
56864	HEILEMAN G BREWING INC	1973	1988	Alcohol
12271	HELME PRODUCTS INC	1965	1975	Tobacco
38324	HEUBLEIN INC	1965	1982	Alcohol
23309	HILTON HOTELS CORP	2004	2007	Gambling
79980	HOLLY HOLDINGS INC	1993	1997	Gambling
79171	HOLLYWOOD CASINO CORP	1993	2001	Gambling
67977	ICEE USA CORP	1985	1987	Alcohol
33101	IMPERIAL TOB CO CDA LTD	1965	1969	Tobacco
84539	INDEPENDENCE BREWING COMPANY	1997	1999	Alcohol
84742	INTERACTIVE SYSTEMS WORLDWIDE IN	2004	2007	Gambling
45277	INTERNATIONAL GAME TECHNOLOGY	1981	2014	Gambling
78893	INTERNATIONAL GAMBLING MANAGMNT IN	1993	1993	Gambling
67619	INTERNATIONAL THOROUGHBRED BRDRS	1982	1997	Gambling
77897	ISLE OF CAPRI CASINOS INC	1992	2016	Gambling
46253	JACQUINS CHARLES ET CIE INC	1972	1975	Alcohol
90972	JONES SODA CO	2005	2012	Alcohol
79606	LADY LUCK GAMBLING CORP	1993	1998	Gambling
90505	LAS VEGAS SANDS CORP	2004	2018	Gambling
12837	LIGGETT GROUP INC	1965	1980	Tobacco
83525	LION BREWERY INC	1996	1999	Alcohol
49780	LION COUNTRY SAFARI INC	1972	1984	Alcohol
26710	LOEWS CORP	1971	2011	Tobacco
89303	LOEWS CORP	2007	2008	Tobacco
50068	LONE STAR BREWING CO	1972	1977	Alcohol
12896	LORILLARD CORP	1965	1968	Tobacco
17279	LORILLARD INC	2008	2015	Tobacco
79715	M B C HOLDING CO	1993	2002	Alcohol
11891	M G M RESORTS INTERNATIONAL	1988	2018	Gambling
12226	M G P INGREDIENTS INC	1988	2018	Alcohol
78147	M T R GAMBLING GROUP	1992	2014	Gambling
81667	MAFCO CONSOLIDATED GROUP INC	1995	1996	Tobacco
65533	MANDALAY RESORT GROUP	1983	2005	Gambling
60441	MIRAGE RESORTS INC	1978	1999	Gambling
59248	MOLSON COORS BREWING CO	1975	2018	Alcohol
90562	MOLSON COORS BREWING CO	2005	2018	Alcohol
79507	MONARCH CASINO & RESORT INC	1993	2018	Gambling
76395	MOUNTAINTOP CORP	1990	1990	Alcohol
76839	NATIONAL BEVERAGE CORP	1991	1995	Alcohol
78913	NEW DAY BEVERAGE INC	1993	1995	Alcohol
60709	NEVADA GOLD & CASINOS INC	1979	2018	Gambling
82808	NOR WESTER BREWING INC	1996	1997	Alcohol

58721	NUTRI BEVCO INC	1984	1987	Alcohol
59468	OLYMPIA BREWING CO	1972	1983	Alcohol
34892	OPELIKA MANUFACTURING CORP	1983	1985	Tobacco
80562	P D S GAMBLING CORP	2004	2004	Gambling
59416	PABST BREWING CO	1972	1985	Alcohol
83606	PACIFIC GREYSTONE CORP	1996	1997	Tobacco
75682	PAVICHEVICH BREWING CO	1989	1992	Alcohol
62042	PENFORD CORP	1986	2000	Alcohol
80563	PENN NATIONAL GAMBLING INC	1994	2018	Gambling
13856	PEPSICO INC	1965	2018	Alcohol
82627	PETES BREWING CO	1995	1998	Alcohol
92602	PHILIP MORRIS INTERNATIONAL INC	2008	2018	Tobacco
42140	PINNACLE ENTERTAINMENT GROUP INC	2004	2014	Gambling
16001	PINNACLE ENTERTAINMENT INC NEW	2016	2017	Gambling
63184	PITTSBURGH BREWING CO	1983	1986	Alcohol
10857	PLAYERS INTERNATIONAL INC	1986	1999	Gambling
90958	POKERTEK INC	2006	2014	Gambling
76746	POWERHOUSE TECHNOLOGIES INC	1991	1998	Gambling
85310	PREMIUM CIGARS INTERNATIONAL LTD	1997	1999	Tobacco
79297	PRIMADONNA RESORTS INC	1993	1998	Gambling
25786	PURE WORLD INC	1982	2004	Alcohol
82710	PYRAMID BREWERIES INC	1995	2008	Alcohol
29867	PYXUS INTL INC	2017	2018	Tobacco
13354	QUANTUM CHEMICAL CORPORATION	1965	1993	Alcohol
82517	R H PHILLIPS INC	1995	2000	Alcohol
14218	R J R NABISCO INC	1965	1986	Tobacco
65577	RAINIER COMPANIES INC	1972	1978	Alcohol
86843	RAVENSWOOD WINERY INC	1999	2001	Alcohol
16019	RED ROCK RESORTS INC	2016	2018	Gambling
86946	REYNOLDS AMERICAN INC	1999	2017	Tobacco
42323	RHEINGOLD CORP	1965	1974	Alcohol
12395	RIO HOTEL & CASINO INC	1984	1997	Gambling
83458	RIVIERA HOLDINGS CORP	1996	2009	Gambling
79289	ROBERT MONDAVI CORP THE	1993	2004	Alcohol
87816	ROCK CREEK PHARMACEUTICALS INC	2001	2015	Tobacco
76053	ROCKY MOUNTAIN BEVERAGE CO	1989	1991	Alcohol
91687	SANDS REGENT	1985	2007	Gambling
47562	SCHAEFER F & M CORP	1969	1981	Alcohol
19385	SCHENLEY INDUSTRIES INC	1965	1971	Alcohol
45081	SCHLITZ JOS BREWING CO	1967	1982	Alcohol
90238	SENOMYX INC	2004	2017	Alcohol
56434	SHOWBOAT INC	1973	1997	Gambling
91207	STARWOOD HOTELS & REST WLDWD INC	2006	2014	Gambling
79192	STATION CASINOS INC	1993	2007	Gambling
84334	STEARNS AND LEHMAN INC	1996	2002	Alcohol
36951	STERLING BREWERS INC	1965	1965	Alcohol

84374	SWISHER INTERNATIONAL GROUP INC	1996	1999	Tobacco
74772	TAYLOR WINE INC	1972	1977	Alcohol
87828	TECHNOLOGY FLAVORS & FRAG INC	2000	2004	Alcohol
92436	TELLUS INDUSTRIES INC	1991	1995	Alcohol
71192	TIBURON VINTNERS INC	1972	1973	Alcohol
80940	TIX CORP	2008	2010	Gambling
76401	TODHUNTER INTERNATIONAL INC	1972	1975	Alcohol
13970	TRUETT HURST INC	2013	2018	Alcohol
90911	TRUMP ENTERTAINMENT RESORTS INC	2005	2009	Gambling
81676	TRUMP HOTELS & CASINO RESRTS INC	2004	2004	Gambling
16083	TURNING POINT BRANDS INC	2016	2018	Tobacco
15077	U S T INC	1965	2009	Tobacco
41291	UNIVERSAL CIGAR CORP	1965	1984	Tobacco
75559	W I N E INC	1987	1989	Alcohol
37890	WAITT & BOND INC	1965	1973	Tobacco
19940	WALKER HIRAM GOODERHAM & WORTS	1965	1980	Alcohol
61890	WALKER HIRAM RES LTD	1980	1985	Alcohol
75233	VECTOR GROUP LTD	1987	2018	Tobacco
78216	VERMONT PURE HOLDINGS LTD	1992	1999	Alcohol
80955	WILLAMETTE VALLEY VINYDS INC	1994	2018	Alcohol
82236	WYNDHAM INTL INC	2004	2005	Gambling
89533	WYNN RESORTS LTD	2002	2018	Gambling
87005	YOUBET COM	1999	2009	Gambling